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Effects of Staple Food Consumption Pattern on Achieving Food Security in Girisekar Village, Gunungkidul, Yogyakarta

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Abstract

The aims of the research were to determine the effects of staple food's consumption pattern on food security level and to analyze the difference of food security level achievement by energy consumption level in variation of staple food's consumption pattern in Girisekar Village. The basic method used in this research was survey method. Purposive sampling method was applied to set the location and quota sampling method was used to pick the samples. The effect of staple food's consumption pattern on food security level was determined using regression analysis and the difference of food security level achievement by energy consumption level in variation of staple food's consumption pattern was analyzed using Chi Square analysis. The results of the research showed there was relationship between staple food's consumption pattern and food security level and there was difference on food security level achievement by energy consumption level in variation of staple food's consumption pattern in Girisekar Village indicated by Chi Square value of 42.679. In general, we suggested improvement in variation of the staple food's consumption pattern since it can increase the energy consumption level to achieve better food security.

1. Introduction

Food is the most important need for humans. Achieving food security and reducing poverty is big agenda within the framework of global development. In this case, FAO is targeting the number of poor people and food insecurity in the world to decline [1]. Indonesia as a country committed to strengthening food security and reducing poverty has made various efforts to achieve these targets. The efforts that have been made include establishing the development of food security as one of the main programs of national development. In this regard, the Ministry of Agriculture has established the issue of food security as one of the main medium-term programs 2005-2009 [2].

Food security is achieved if all residents have physical and economic access to food to meet nutritional adequacy according to their needs in order to live a healthy and productive life from day to day. Adequate food availability is a guarantee for humans to live and to work productively. Food security can be defined as the ability to meet the food sufficiency of people from time to time. However, the realization of food security is not only by provisioning adequate food availability but also by maintaining the quality and fulfillment of good nutrition [3]. According to nutritional requirement or dietary recommendation, diet

for healthy body should contain carbohydrate, protein, fat, vitamins, and minerals in sufficient amount. The balance in the intake of those food elements reflects the quality of food consumption.

The population in Indonesia is increasing tremendously leading to higher demand of rice as staple food. This condition causes the national rice production no longer be able to fulfill the demand. Besides, nutritional adequacy that must be met from food in general is still not much noticed in the menu arrangement of daily household food ingredients. Many households pay more attention to the quantity of food and pay less attention to the quality of food in the composition of the daily food menu.

There are approximately 81 million people who experience energy and protein deficits and about 8 million people are in food insecurity. In Addition, the nutritional status of children, infant mortality rates, and child growth disorders indicate the lack of adequate nutritional needs at individual level. Thus, it can be said that the quality of community food consumption is still low.

The quality of food consumption, which is largely determined by the pattern of daily food consumption (staple food), can be assessed by the expected food consumption pattern (PPH). PPH is a diverse composition of food or food groups based on the proportion of energy contribution to total energy that is able to meet food and nutrition consumption needs in terms of quantity, quality and diversity. From the assessment of PPH, the number of nutritional adequacy, diversity, and balance of food consumption patterns can be known.

The food consumption pattern is influenced by the level of education, income, the distance of the house from the shopping center, tradition, and the number of family members. The long distance between shopping center to house can limit the diversity of food sources leading to food consumption pattern which is less in variation [4] cit. [5]. Consumption of staple food that only depends on one specific commodity (e.g. rice) is not stable with a lower PPH value compared to the consumption of various staple foods [6]. This means consumption of varied staple food will affect the quality of food consumption.

To achieve food security, regions which can produce local food crop able to replace rice need to be developed. Besides, rice substitution using local food crop such as cassava is feasible because cassava is lower in price compared to rice, so that the people are able to purchase and procure them as energy source in their diet.

Staple food diversification has been applied in Girisekar Village, Gunungkidul Regency due to its natural conditions. This regency suffers from drought annually and the soil is less fertile to cultivate rice. Hence, this problem forces the people in Gunungkidul to survive by using local food commodity which is easier to produce with their natural condition [7].

The potential of local food (cassava) to replace rice in Girisekar Village can produce various kinds of staple food consumption patterns. Different patterns of staple food consumption are assumed to affect the food security level. The more varied staple food consumed by a household, the higher the level of household food security. Based on the formulation of the problem, a study was conducted on the effect of staple food consumption patterns on the level of household food security based on the level of energy consumption in Girisekar Village, Panggang District, Gunungkidul, Yogyakarta.

2. Methods

Survey method was applied in this study. Survey method is an investigation conducted to obtain facts from existing symptoms and to find factual information, either about social, economic or political institutions of a group or an area [8]. Survey research is also defined as a research method that takes samples from a population by using questionnaires as a primary data collection tool [9].

The location of the survey was determined using purposive sampling method based on the characteristic of the population which was in accordance with the objective of the study. Girisekar village was chosen due to its large cassava plantation area with high number of population. Quota sampling was used to determine samples. Quota sampling is a sample determination technique by taking samples in a certain amount that is considered to reflect the characteristics of the population. The samples used in this study were women or housewives or other family members as household

representatives who knew about food consumption in the family.

There were 100 households chosen and classified based on their staple food consumption pattern. The classification of the staple food consumption pattern is as follow:

1. Only rice is consumed as staple food (B)
2. Rice is consumed more frequently than non-rice (B>NB)
3. Rice is consumed less frequently than non-rice (B<NB)

Data collected in this study consisted of primary and secondary data which were obtained by observation, interview, and recording/documentation. Primary data were collected from the interview with the people of Girisekar Village and the results of questionnaire answer. While secondary data were collected from institute or agency related to the study both directly and indirectly.

To identify the staple food consumption pattern and food security based on the level of energy consumption, descriptive analysis was used. Descriptive analysis is a research method that is used to provide an overview of a situation or event so that this method intends to accumulate basic data. This method does not only provide an overview of certain phenomena but also explains relationships, tests hypotheses, makes predictions and gets the meaning and implications of a problem that is solved [8].

From data of the three staple food consumption patterns, the amount of rice and non rice (in this study is cassava) consumption in each household (kg/day/household) was converted to kcal by multiplying the amount of each household's consumption with conversion unit which was already determined. The converted values then were analyzed using software of Analisis Situasi dan Kebutuhan Konsumsi Pangan Wilayah Kabupaten (Analysis of Situation and Needs for Regency Food Consumption) which was issued by Pusat Pengembangan Konsumsi Pangan Badan Bimas Ketahanan Pangan Departemen Pertanian (Center for Food Consumption Development, Ministry of Agriculture's Food Security Agency) in cooperation with Departemen Gizi Masyarakat dan Sumberdaya Keluarga Fakultas Pertanian Institut Pertanian Bogor (Department of Community Nutrition and Family Resources, Faculty of Agriculture, Bogor Agricultural University) in 2005. From the analysis result, the food consumption patterns of the households observed were identified.

To know the level of energy consumption, the calculation steps of PPH were applied by using software of Analisis Situasi dan Kebutuhan Konsumsi Pangan Wilayah Kabupaten (Analysis of Situation and Needs for Regency Food Consumption) which was issued by Pusat Pengembangan Konsumsi Pangan Badan Bimas Ketahanan Pangan Departemen Pertanian (Center for Food Consumption Development, Ministry of Agriculture's Food Security Agency) in cooperation with Departemen Gizi Masyarakat dan Sumberdaya Keluarga Fakultas Pertanian Institut Pertanian Bogor (Department of Community Nutrition and Family Resources, Faculty of Agriculture, Bogor Agricultural University) in 2005. The values of energy consumption (kcal) obtained from the PPH calculation were analyzed to determine the food security level with the classification as follow [10]:

1. A household can be said to achieve food security if the energy consumption meets the recommendation (2200kcal/capita/day) or energy consumption level ≥90%.
2. A household is in mild food insecurity if the energy consumption level reaches 80-89% of calories intake requirement per day.
3. A household is in moderate food insecurity if the energy consumption level reaches 70-79% of calories intake requirement per day.
4. A household is in severe food insecurity if the energy consumption level ≤70% of calories intake requirement per day.

Simple linear regression analysis was performed to determine the relationship between staple food consumption pattern and food security level. While Chi Square test was applied to analyze the differences of food security level based on the level of energy consumption in the staple food consumption pattern.

3. Results and Discussion

1.1. Food security level based on energy consumption level

Food security according to Law No. 7 of 1996 concerning food is the condition of fulfilling food for

households which is reflected in the availability of sufficient quantities and quality, safe, evenly distributed and affordable food. Sufficient energy consumption in a household is one of the important indicators that can be seen to achieve food security. Based on the recommendations of Widya Karya National Food and Nutrition IX in 2008, the amount of energy sufficiency is 2200 kcal / capita / day. The amount of household energy consumption in Girisekar Village can be seen in Table 1 and 2.

Table 1. Daily energy consumption per capita in Girisekar Village

Energy consumption level	Kcal/capita/day
Lowest	692.5
Highest	3608.6
Average	1893.2

Table 2. Composition of daily energy consumption per capita in Girisekar Village

Food type	Energy Kcal/capita/day
Grains	247.7
Tubers	1067
Animal based food	113.8
Oil and fat	110.4
Oily fruits or seeds	42.8
Beans and legumes	73.47
Sugar	157.3
Fruits and vegetables	69.09
Others	16.62
Total	**1893.2**

Based on Table 1, the lowest energy consumption by households in Girisekar Village is 692.5 kcal and the highest energy consumption is 3608.6 kcal with an average consumption of 1893.2 kcal. The energy consumption comes from the consumption of tubers which ranks first as the largest energy supplier in Girisekar Village at 1067 kcal / capita / day. This is successively followed by energy consumption from consumption of grains (247.7 kcal / capita / day), sugar (157.3 kcal / capita / day), beans and legumes (73.47 kcal / capita / day) and vegetables and fruit (69.09 kcal / capita / day). Based on these data, it can be seen that Girisekar Village residents consume more tubers as their biggest energy supplier.

Food security level is the level of food security of a household which is measured using the level of energy consumption. Based on the recommendations of Widya Karya National Food and Nutrition IX in 2008, the food security level of a household is categorized into four levels, namely: 1) severe food insecurity (energy consumption level ≤ 70%), 2) moderate food insecurity (energy consumption level 70-79%), 3) mild food insecurity (energy consumption level 80-89%), and 4) food secure (consumption level ≥90%).

From data obtained, the level of energy consumption of each household was then compared to the recommended energy consumption to determine the food security level. The grouping of the households observed into food security level categories is presented in Table 3.

Table 3. Composition of daily energy consumption per capita in Girisekar Village

Food security level	Number of household (sample)	Percentage (%)
Severe food insecurity (Energy consumption level ≤ 70%)	26	26
Moderate food insecurity (Energy consumption level 70-79%)	14	14
Mild food insecurity (Energy consumption level 80-89%)	14	14
Food secure (Energy consumption level ≥ 90%)	46	46
Total	**100**	**100**

Based on Table 3, it can be seen that the majority of Girisekar Village people are in food insecurity.

However, when viewed from the overall average energy consumption level (Table 1), the energy consumption level reaches 86.06%, which means that it is in the category of mild food insecurity.

1.2. Staple food consumption pattern and food security level

Food consumption patterns are the way a person or group of people choose and eat food as a response to physiological, psychological, cultural and social influences. So that studies that affect food consumption patterns can include activities in choosing food, obtaining food, storing food, and the amount consumed and so on.

The number of food types in a food consumption pattern in an area usually develops from local food or from food/crop that has been planted in the area for a long time. Staple food in an area usually occupies an important role and its use is wider than other types of food. It is probable that the staple food in an area develops and be produced and processed from local plants in large quantities during the growing season or stored easily for long periods of time.

The development of food consumption pattern in this study is focused on diversifying foods derived from staple foods other than rice, especially cassava-based foods consumed by the people in Girisekar Village. Each region has a food consumption pattern with specific menu and is reflected in the daily menu composition. In this case, Girisekar Village also has its own staple food consumption pattern and based on observations can be grouped into:

1. Only rice is consumed as staple food (B)
2. Rice is consumed more frequently than non-rice (B>NB)
3. Rice is consumed less frequently than non-rice (B<NB)

The grouping based on the amount of staple food consumption aims to compare the level of energy consumption in each type of staple food consumption pattern. To compare the level of energy consumption, staple foods in the form of rice and non-rice are converted into grams. Data from the questionnaire regarding the staple food consumed by one family are transferred to a list containing the amount consumed in the household (kg) and then converted to grams (g). The number of samples based on the pattern of staple food consumption and the level of food security in Girisekar Village can be seen in Table 4.

Table 4 shows that of the three staple food consumption patterns, the highest number of the sample was observed to have the third staple food consumption pattern (B <NB), that is, rice is consumed less frequently than non-rice by 85%. Only 7% consume rice only (B). Meanwhile 8% of the people combine rice with cassava as their staple food. From this proportion it can be said that households in Girisekar Village have utilized alternative staple food in their area.

Table 4. Proportion of samples based on the pattern of staple food consumption and the level of food security in Girisekar Village

Food security level	Pattern B (%)	Pattern B>NB (%)	Pattern B<NB (%)	Total
Severe food insecurity	7	7	12	26
Moderate food insecurity	0	0	14	14
Mild food insecurity	0	1	13	14
Food secure	0	0	46	46
Total	7	8	85	100

According to the grouping of food security levels based on the level of energy consumption, from 7 samples with food consumption pattern of only rice (B), all of them are in the category of severe food insecurity. While of the 8 samples with food consumption pattern of rice more than non rice (B>NB), 7 samples are in severe food insecurity and 1 sample is in the mild food insecurity. And from 85 samples with food consumption pattern of rice less than non rice (B<NB), as many as 12 samples are in severe food insecurity, 14 samples are in moderate food insecurity, 13 samples are in mild food insecurity, and 46 samples are categorized as food secure. This indicates that even though most of the households in Girisekar Village are in the category of food insecurity, the use of local food substitutes for rice in Girisekar

Village such as cassava can be assumed to be able to support an increase in the food security level.

To determine whether there is a difference in the level of food security in various staple food consumption patterns, Chi Square test was performed (Table 5). Chi Square analysis results show a significant difference in the level of food security based on the level of energy consumption in various staple food consumption patterns in Girisekar Village. The staple food consumption pattern of rice less than non rice (B <NB) gave the highest percentage of households that are food secure compared to staple food consumption pattern of rice only (B) and rice more than non rice (B> NB). In other words, the variation of staple food consumed by a household affects the level of household food security. This result is also supported from linear regression analysis.

Table 5. Chi Square test on the food security levels in various staple food consumption patterns of households in Girisekar Village

Food security level	Staple food consumption pattern			$\chi 2$
	B	B>NB	B<NB	
Severe food insecurity	7	7	12	42.679 *
Moderate food insecurity	0	0	14	
Mild food insecurity	0	1	13	
Food secure	0	0	46	

Note: * means there is significant difference at 5%.

Based on the results of simple linear regression analysis, an equation was obtained as follow:

$$Y=1.207X - 0.555$$

Note:
Y= food security level based on energy consumption level
X= staple food consumption pattern

The coefficient of regression of 1.207 means that an increase of one unit of food consumption pattern will increase food security as much as 1.207.

Food availability that is sufficient, safe, and healthy at all times is the main thing that becomes the pillar of a prosperous family. In its achievement, attention must be paid to procurement, food selection, regulation, and management of food stocks or food reserves and their provision. If all goes well it means food security can be achieved at the household level.

The staple foods consumption pattern that only depends on one specific type of food group (for example rice) will not be stable so the importance of developing local food is expected to improve the quality of food security. The more diverse consumption of food, the quality of food security will also be better. Girisekar Village is an area with limited factors for agricultural sector such as less fertile soil and drought. However, this area has potential to produce agricultural products which are easier to cultivate with limited water, such as cassava. Cassava can be used as staple food to replace rice considering its high content of carbohydrate as energy source. This condition then leads to three types of staple food consumption patterns in Girisekar Village i.e. B, B>NB, and B<NB. These varied food consumption patterns significantly influence the level of food security. The more variety of staple foods consumed by a household, the better the level of household food security.

Higher percentage of households achieving food security in B<NB staple food consumption pattern shows that the achievement of food security is reflected in the use of cassava as local food which is abundantly available and easy to get as staple food to replace rice. However, the improvement of other food group consumption is also necessary to complete the composition of nutritional intake.

4. Conclusion

There are differences in the achievement of food security levels based on the level of energy consumption in various patterns of staple food consumption in Girisekar Village. All households with staple food consumption pattern of only rice are food insecure, while some households with staple food consumption pattern of combinations of rice and

cassava are able to achieve food security. Variations in the pattern of staple food consumption can significantly improve the achievement of food security in Girisekar Village, Gunungkidul, Yogyakarta. Even so, variations in consumption patterns of staple food also need to be balanced with consumption of other food groups in order to obtain better food security. In addition, government support is needed in supporting and increasing the production of local food crop as an alternative to rice. The forms of support that can be given include providing high quality seeds of local plants to replace rice (cassava, corn, etc.) followed by intensive counseling so that there is no food insecurity and dependence on only one commodity. Communities need to know information about the adequacy of food consumed in terms of both quantity and nutritional content and information on food processing so that they can increase the level of food security.

References

[1] FAO. 1999. Food Insecurity, when People Must Live with Hunger and Fear of Starvation. The State of Food Inscurity in the World. Rome.

[2] Ministry of Agriculture of Indonesia. 2005. Rencana Pembangunan Pertanian tahun 2005-2009 (Agricultural Development Plan for 2005-2009). Jakarta.

[3] Tambubolon, P. 1998. Peranan Wanita dalam Mensukseskan Upaya Diversifikasi Pangan. (The Role of Women in Successful Food Diversification Efforts) (http://www.Uni-stuttgart.de/Indonesia/News/info.html)

[4] Sumarwan. 1993. Keluarga Masa Depan dan Perubahan Pola Konsumsi. (Future Family and Changes in Consumption Patterns) Warta Demografi. Tahun ke-23 no 5 LD FEUI. Jakarta.

[5] Akmal. 2006. Analisis Pola Konsumsi Keluarga di Kecamatan Tallo Kota Makassar. (Analysis of Family Consumption Patterns in Tallo District, Makassar City) (http://www.damandiri.or.id/file/akmalbab2.pdf)

[6] Ilham, Nyak and Sinaga B. M. 2005. Penggunaan Pangsa Pengeluaran Pangan sebagai Indikator Komposit Ketahanan Pangan (The Use of Food Expenditure Share as a Composite Indicator of Food Security). Bogor: Pusat Studi Analisis Sosial Ekonomi dan kebijakan Pertanian Bogor (www.ejournal.unud.ac.id/abstrak)

[7] Puspitaningrum, D. A. 2008. Peran Makanan Pengganti Beras terhadap Ketahanan Pangan Rumah Tangga di Desa Girisekar Kecamatan Panggang Kabupaten Gunungkidul Yogyakarta (The Role of Rice Substitution Food for Household Food Security in Girisekar Village, Panggang District, Gunungkidul Regency, Yogyakarta): LPPM UPN "Veteran" Yogyakarta.

[8] Nazir, M. 1998. Metodologi Penelitiam. (Research methodology) Ghalia Indonesia.

[9] Singarimbun, M. and Effendy S. 1995. Metode Penelitian Survai. (Survey Research methodology) PT. Pustaka LP3ES. Jakarta.

[10] Suryana, A. and Pribadi N. 2008. Meningkatkan Keterjangkauan Menuju Ketahanan Pangan Keluarga. Widyakarya Nasional Pangan dan Gizi IX. (Increasing Affordability Towards Household Food Security. Widya Karya National Food and Nutrition IX) Jakarta 26-27 Agustus 2008.